

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
16 November 2000 (16.11.2000)

PCT

(10) International Publication Number  
**WO 00/68396 A3**

- (51) International Patent Classification<sup>7</sup>: C12N 15/56, 9/24, 1/21, D21C 9/10
- (21) International Application Number: PCT/US00/13172
- (22) International Filing Date: 12 May 2000 (12.05.2000)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:  
60/133,714 12 May 1999 (12.05.1999) US
- (71) Applicant: XENCOR, INC. [US/US]; 2585 Nina Street, Pasadena, CA 91107-3708 (US).
- (72) Inventor: BENTZIEN, Joerg, M.; 277 Pleasant Street #103, Pasadena, CA 91101 (US).
- (74) Agents: TRECARTIN, Richard, F. et al.; Flehr Hohbach Test Albritton & Herbert LLP, Suite 3400, 4 Embarcadero Center, San Francisco, CA 94111-4187 (US).
- (81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW.
- (84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).
- Published:  
— With international search report.
- (88) Date of publication of the international search report:  
8 March 2001
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.



WO 00/68396 A3

(54) Title: BACILLUS CIRCULANS XYLANASE MUTANTS

(57) Abstract: The invention relates to novel xylanase activity (XA) proteins and nucleic acids. The invention further relates to the use of the (XA) proteins in the process of pulp bleaching.

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 00/13172

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C12N15/56 C12N9/24 C12N1/21 D21C9/10

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C12N D21C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, BIOSIS

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WAKARCHUK W W ET AL: "THERMOSTABILIZATION OF THE BACILLUS CIRCULANS XYLANASE BY THE INTRODUCTION OF DISULFIDE BONDS" PROTEIN ENGINEERING, GB, OXFORD UNIVERSITY PRESS, SURREY, vol. 7, no. 11, 1994, pages 1379-1386, XP002072553 ISSN: 0269-2139 cited in the application the whole document	1,2,6,7, 12,16-21
X	EP 0 828 002 A (CANADA NAT RES COUNCIL) 11 March 1998 (1998-03-11) cited in the application abstract examples 1-15	1,2

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

### \* Special categories of cited documents:

\*A\* document defining the general state of the art which is not considered to be of particular relevance

\*E\* earlier document but published on or after the international filing date

\*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

\*O\* document referring to an oral disclosure, use, exhibition or other means

\*P\* document published prior to the international filing date but later than the priority date claimed

\*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

\*X\* document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

\*Y\* document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

\*Z\* document member of the same patent family

Date of the actual completion of the international search

13 December 2000

Date of mailing of the international search report

19/12/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Lejeune, R

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 00/13172

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 94 24270 A (CAMPBELL ROBERT L ; ISHIKAWA KAZUHIKO (CA); SUNG WING L (CA); ROSE) 27 October 1994 (1994-10-27) cited in the application abstract page 164 ---	1,2
A	WO 98 47089 A (CALIFORNIA INST OF TECHN) 22 October 1998 (1998-10-22) cited in the application the whole document ---	
A	TORRONEN A ET AL: "Structural and functional properties of low molecular weight endo-1,4-beta-xylanases" JOURNAL OF BIOTECHNOLOGY, NL, ELSEVIER SCIENCE PUBLISHERS, AMSTERDAM, vol. 57, no. 1-3, 16 September 1997 (1997-09-16), pages 137-149, XP004097716 ISSN: 0168-1656 -----	

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 00/13172

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0828002 A	11-03-1998	US 5759840 A	02-06-1998
		CA 2210247 A	09-03-1998
		JP 10179155 A	07-07-1998
		NZ 328680 A	27-04-1998
		US 5866408 A	02-02-1999
WO 9424270 A	27-10-1994	US 5405769 A	11-04-1995
WO 9847089 A	22-10-1998	AU 6965498 A	11-11-1998
		EP 0974111 A	26-01-2000